

**GENERAL NOTES**

- THE PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED. COORDINATES BASED ON NAD 83/91, MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY, GEODETIC CONTROL STATION NO. 3711 AND 37CA.
- 3711 N 565,004.699 E 1,381,586.920  
37CA N 564,321.638 E 1,382,742.840
- THIS PLAN IS BASED ON A FIELD RUN BOUNDARY SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. NOVEMBER 2008.
- THE TOPOGRAPHY SHOWN HEREON IS BASED ON AN AERIAL TOPOGRAPHIC SURVEY PREPARED BY POTOMAC AERIAL SURVEYS, DATED FEBRUARY 2004.
- SOIL TYPES SHOWN HEREON ARE IN ACCORDANCE WITH THE WEB SOIL SURVEY - HOWARD COUNTY, MARYLAND.
- EXISTING UTILITIES LOCATED FROM TOPOGRAPHIC SURVEY AND AS-BUILT DRAWINGS. CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION ACTIVITIES AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE.
- NO FLOODPLAINS EXIST ON-SITE.
- NO STEEP SLOPES EXIST ON-SITE.
- NO WETLANDS AND/OR STREAMS EXIST ON-SITE AS CONFIRMED BY ECO-SCIENCE PROFESSIONALS, INC. DATED DECEMBER 20, 2012.
- THE SUBJECT PROPERTY IS ZONED R-ED PER THE 02/02/2004 COMPREHENSIVE ZONING PLAN, AND THE COMPREHENSIVE LITE ZONING AMENDMENTS 07/26/2006.
- DRIVEWAYS SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLINGS TO ENSURE SAFE ACCESS FOR FIRE EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:  
A. WIDTH --- 12' (16' SERVING MORE THAN ONE RESIDENCE);  
B. SURFACE --- 6" OF COMPACTED CRUSHER RUN BASE W/TAR AND CHIP COATING (1-1/2" MIN.);  
C. GEOMETRY --- MAX. 15% GRADE, MAX. 10' GRADE CHANGE AND MIN. 45' TURNING RADIUS;  
D. STRUCTURES (CULVERTS/BRIDGES) --- CAPABLE OF SUPPORTING 25 GROSS TONS (M25 LOADING);  
E. DRAINAGE ELEMENTS --- CAPABLE OF SAFELY PASSING 100-YEAR FLOOD WITH NO MORE THAN 1 FOOT OF DEPTH OVER DRIVEWAY SURFACE;  
F. MAINTENANCE --- SUFFICIENT TO ENSURE ALL WEATHER USE.
- FOR FLAG OR PIPESTEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPESTEM AND ROAD RIGHT-OF-WAY LINE AND NOT TO THE PIPESTEM LOT DRIVEWAY.
- THIS PROPERTY IS WITHIN THE METROPOLITAN DISTRICT.
- WATER AND SEWER SERVICE TO THESE LOTS WILL BE GRANTED UNDER THE PROVISIONS OF SECTION 18.122.B OF THE HOWARD COUNTY CODE.
- WATER AND SEWER SERVICE FOR THIS PROJECT WILL BE PUBLIC. WATER WILL BE PROVIDED THROUGH CONTRACT NO. 14-4412-D. SEWER WILL BE PROVIDED THROUGH CONTRACT NO. 14-4412-D.
- PUBLIC WATER AND SEWER ALLOCATION WILL BE GRANTED AT THE TIME OF ISSUANCE OF THE BUILDING PERMIT IF CAPACITY IS AVAILABLE AT THAT TIME.
- A USE-IN-COMMON ACCESS MAINTENANCE AGREEMENT FOR THE BENEFIT OF LOTS 18, 19, 37, LOT 3 - GEELHAAR PROPERTY, NON-BUILDABLE BULK PARCEL "A" AND THE FUTURE RESUBDIVISION OF LOT 3 - GEELHAAR PROPERTY WAS RECORDED IN THE LAND RECORDS OF HOWARD COUNTY, MARYLAND AS L-1 UNDER F-13.
- TO THE BEST OF OUR KNOWLEDGE AND BELIEF, THERE ARE NO HISTORIC STRUCTURES EXISTING ON THIS SITE.
- THIS PROJECT IS USING THE R-20 OPTION OF THE R-ED REGULATIONS.  
DENSITY TABULATION (PROJECT): 1.4440 ACRES  
- DWELLING UNITS PER NET ACRE = 62903 SF / 20,000 SF = 3.14 OR 3 ALLOWED  
- DWELLING UNITS PROPOSED = 3 (1 EXISTING TO REMAIN AND 2 PROPOSED)
- NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE REQUIRED WETLANDS, STREAMS OR THEIR BUFFERS, FOREST CONSERVATION EASEMENT AREAS AND 100-YEAR FLOODPLAIN.
- AS REQUIRED, GEOTECHNICAL INVESTIGATIONS SHALL BE COMPLETED AS PART OF THE SUBDIVISION PLAN PACKAGE.
- A FOREST STAND DELINEATION PLAN WAS PREPARED BY ECO-SCIENCE PROFESSIONALS, INC. DATED DECEMBER 20, 2012.
- FOREST CONSERVATION OBLIGATIONS FOR THIS PROJECT SHALL BE ADDRESSED BY A FOREST CONSERVATION PLAN SUBMITTED WITH THE SUBDIVISION PLANS. PRELIMINARY ANALYSIS REQUIRES 0.2 ACRES OF AFFORESTATION. THIS OBLIGATION SHALL BE MET BY A PAYMENT OF FEE-IN-LIEU.
- THE PROPOSED ACCESS SHALL BE PROVIDED BY THE EXISTING USE-IN-COMMON DRIVEWAY TO WECKER WAY, GROVEMONT OVERLOOK PHASE 1 FOR 122'-12".
- LANDSCAPING FOR LOTS 4-6 SHALL BE PROVIDED IN ACCORDANCE WITH A CERTIFIED LANDSCAPE PLAN, TO BE SUBMITTED WITH THE SUBDIVISION PLANS, IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL.
- THE PROPOSED SUBDIVISION AND RELATED CONSTRUCTION WILL NOT IMPACT ENVIRONMENTAL FEATURES OR BUFFERS.
- TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO BURIAL GROUNDS OR CEMETERIES LOCATED ON THIS PROPERTY.
- THERE IS AN EXISTING DWELLING/STRUCTURE ON LOT 4 TO REMAIN. NO NEW BUILDINGS, EXTENSIONS OR ADDITIONS TO THE EXISTING DWELLING ARE TO BE CONSTRUCTED AT A DISTANCE LESS THAN THE ZONING REGULATIONS REQUIREMENTS.
- APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLANS, PRELIMINARY PLAN AND/OR RED-LINE REVISION PLAN. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PROCESS. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
- OPEN SPACE REQUIREMENTS FOR THIS R-ED PROJECT SHALL BE MET THROUGH A PAYMENT OF FEE-IN-LIEU FOR THE TWO PROPOSED LOTS.
- THE PROPOSED UNITS SHALL HAVE AN AUTOMATIC FIRE PROTECTION SPRINKLER SYSTEM.
- STORMWATER MANAGEMENT FOR THE PROJECT IS PROVIDED BY THE USE OF ALTERNATIVE SURFACES, NON STRUCTURAL PRACTICES & MICRO-SCALE PRACTICES IN ACCORDANCE WITH ENVIRONMENTAL SITE DESIGN CRITERIA. MICRO-SCALE PRACTICES INCLUDE A DRYWELL MICRO-BIORETENTION. ALTERNATIVE SURFACES INCLUDE PERMEABLE SURFACES. THESE FACILITIES WILL BE PRIVATELY OWNED AND MAINTAINED.
- THE LIMITS OF DISTURBANCE (LOD) SHOWN ON THE PLAN EXTENDS OFFSITE. LETTERS OF PERMISSION FOR THE REQUIRED OFFSITE GRADING WILL BE PROVIDED AS PART OF THE FINAL PLAN SUBMISSION WHEN FINAL GRADING WILL BE APPROVED.

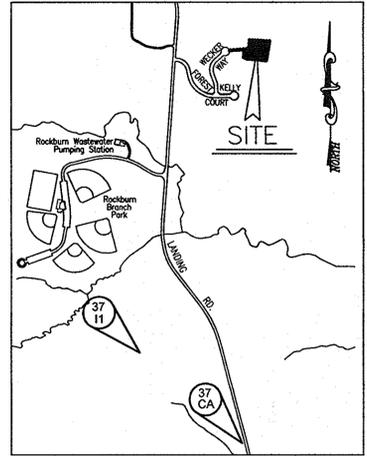
# ENVIRONMENTAL CONCEPT PLAN

# GROVEMONT OVERLOOK - II

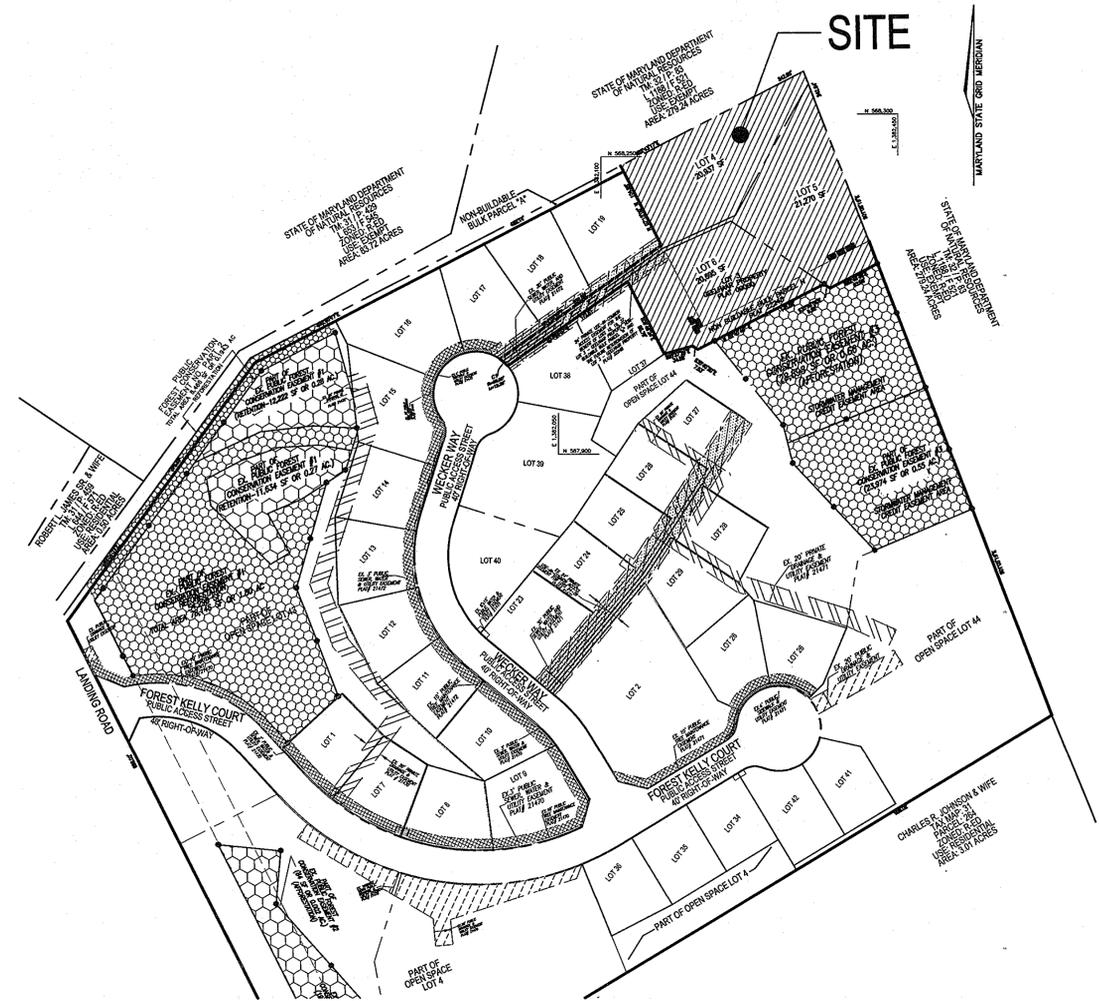
## SFD LOTS 4-6

## HOWARD COUNTY, MARYLAND

BENCHMARKS			
	NORTHING	EASTING	ELEVATION
37CA	564,321.638	1,382,742.840	257.684'
3111	565,004.699	1,381,586.92	306.017'



SHEET INDEX		
DESCRIPTION	SHEET NO.	
COVER SHEET	1 OF 3	
LAYOUT AND GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN	2 OF 3	
STORMWATER MANAGEMENT NOTES AND DETAILS	3 OF 3	



**SITE ANALYSIS DATA**

A. TOTAL PROJECT AREA:	1.4440 AC.
B. AREA OF PLAN SUBMISSION:	0.92 AC. (LOTS 5, 6 & U.I.C. DRIVEWAY)
C. AREA OF WETLANDS AND BUFFERS:	0.00 AC.
D. AREA OF FLOODPLAIN:	0.00 AC.
E. AREA OF FOREST:	0.00 AC.
F. AREA OF STEEP SLOPES:	0.00 AC.
G. ERODIBLE SOILS:	0.44 AC.
H. LIMIT OF DISTURBED AREA:	0.87 AC.
I. PROPOSED USES FOR SITE AND STRUCTURES:	RESIDENTIAL SINGLE FAMILY DETACHED HOMES
J. GREEN OPEN AREA:	1.18 AC.
K. PROPOSED IMPERVIOUS AREA:	0.28 AC.
L. PRESENT ZONING DESIGNATION:	R-ED - (RESIDENTIAL: ENVIRONMENTAL DEVELOPMENT) DISTRICT
M. OPEN SPACE REQUIRED:	1.4440 AC. GROSS AREA x 50% = 0.72 AC.
N. TOTAL NUMBER OF UNITS ALLOWED:	THIS PROJECT IS USING THE R-20 OPTION OF THE R-ED REGULATIONS.
	DENSITY TABULATION (PROJECT): 1.4440 ACRES
	- DWELLING UNITS PER NET ACRE = 62903 SF / 20,000 SF = 3.14 OR 3 ALLOWED
O. TOTAL NUMBER OF UNITS PROPOSED:	3 (2 PROPOSED + 1 EXISTING TO REMAIN)
P. DPZ FILE REFERENCES:	VP-83-84, F-84-214/GEELHAAR PROPERTY, LOT 1, PLAT 5941 & F-13-054

**ENVIRONMENTAL SITE DESIGN NARRATIVE:**  
IN ACCORDANCE WITH CHECKLIST ITEM III.K.

- III.K.
- THERE ARE NO "NATURAL AREAS" ON THIS PROJECT.  
NO DISTURBANCE TO THE NATURAL AREAS, STREAMS, STREAM BUFFER, WETLAND AND/OR WETLAND BUFFER RESOURCES IS PROPOSED.
  - NO DRAMATIC DISTURBANCE TO THE NATURAL DRAINAGE PATTERNS ARE PROPOSED. PLEASE REFER TO THE PROPOSED GRADING. THE DRAINAGE PATTERNS / DRAINAGE DIVIDES AS DETAILED ON THE APPROVED F-09-122 PLANS. FOR THE MOST PART, WILL REMAIN UNCHANGED. A PORTION OF THE PROPOSED RUNOFF / MICROSCALE PRACTICE OVERFLOW WILL FLOW OVERLAND BEFORE ENTERING THE CLOSED SYSTEM OF GROVEMONT OVERLOOK WHERE IT WILL BE CAPTURED AND CONVEYED TO AN EXISTING STORMWATER MANAGEMENT FACILITY. THE REMAINING "MANAGED" RUNOFF OVERFLOW WILL LEAVE THE SITE IN ITS NATURAL FLOW PATTERN.
  - THE CONCEPTUAL REDUCTION IN IMPERVIOUS AREA THROUGH BETTER SITE DESIGN IS ACHIEVED THROUGH THE ENVIRONMENTAL SITE DESIGN (ESD) FOR THE PROJECT. THE ESD CONCEPT PROPOSES THE USE OF NON-STRUCTURAL PRACTICES, DISCONNECTION OF ROOFTOP RUNOFF, ALTERNATIVE SURFACES - PERMEABLE SURFACES AND MICRO SCALE PRACTICES - DRYWELL & MICRO BIORETENTION FACILITIES. ESD PRACTICES SHALL BE PRIVATELY OWNED AND MAINTAINED.
  - CONCEPTUAL SEDIMENT CONTROLS ARE SHOWN HEREON. PROPOSED SEDIMENT CONTROLS FOR THIS PLAN WILL BE PROVIDED THROUGH THE USE PERMITTER CONTROLS (SILT & SUPER SILT FENCE) AS TYPICALLY REQUIRED BY INDIVIDUAL HOUSE CONSTRUCTION DURING SITE DEVELOPMENT PLAN / NON-CONSTRUCTION STAGE OF THE PROJECT. THE SEDIMENT CONTROLS SHALL BE IN ACCORDANCE WITH THE CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT.  
THE LIMITS OF DISTURBANCE (LOD) IS SHOWN ON THIS PLAN.  
NO LETTERS OF PERMISSION FOR OFFSITE GRADING WILL BE REQUIRED.
  - STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET THROUGH THE USE OF NON-STRUCTURAL PRACTICES, DISCONNECTION OF ROOFTOP RUNOFF, ALTERNATIVE SURFACES - PERMEABLE SURFACE AND MICRO SCALE PRACTICES - MICRO BIORETENTION FACILITIES. REQUIRED PE VALUE FOR THIS PROJECT IS 1.6"  
- THE PROJECT SHALL PROVIDE THE REQUIRED ESDv (PER THE REQUIRED PE = 1.6") FOR THE PROPOSED IMPERVIOUS AREAS.  
- IN ADDITION TO THE PROPOSED ESDv PRACTICES PROPOSED, A PORTION OF THE MICRO-BIORETENTION FACILITIES OVERFLOW ON LOT 6 WILL BE CAPTURED, CONVEYED AND FURTHER TREATED WITHIN SUBAREA "C" OF F-09-122 BY THE APPROVED F-09-122 REGIONAL QUALITY / QUANTITY STORMWATER FACILITY #3.  
- THE PROPOSED MICRO-BIORETENTION FACILITIES OVERFLOW ON LOT 5 & 6 SHALL BE DIRECTED INTO SUBAREA "C" OF F-09-122 WHICH CONTAIN A WETLAND AND PLANTED FOREST CONSERVATION. THIS AREA IS ALSO DESIGNATED AS A STORMWATER MANAGEMENT CREDIT AREA.  
THE END RESULT OF THIS CONCEPTUAL ENVIRONMENTAL SITE DESIGN; THIS PROJECT SHALL REFLECT "WOODS IN GOOD CONDITION".
  - AT THIS CONCEPT STAGE OF DEVELOPMENT, A WAIVER IS REQUIRED FOR THE REMOVAL OF SPECIMAN TREE "A". THE REMOVAL OF THIS TREE IS REQUIRED FOR THE CONSTRUCTION OF THE HOME AND SUPPORTING SLOPES ON LOT 5.  
- THE WAIVER WILL BE SUBMITTED WITH THE FUTURE PROCESSING OF THE SUBDIVISION PLANS. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) DOES NOT CONSTITUTE AN APPROVAL OF FORTHCOMING WAIVERS PETITIONS.

MINIMUM LOT SIZE CHART			
LOT #	GROSS AREA	PIPESTEM AREA	NET AREA
4	20,937 SF	926 SF	20,011 SF
5	21,270 SF	1,265 SF	20,005 SF
6	20,695 SF	692 SF	20,003 SF

MAPPED SOILS TYPES						
SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	THREAT INCLUDING	K-FACTOR	USDA FASLAND
CeB	CHILLUM LOAM, 2 TO 5 PERCENT SLOPES	B	NO	NO	0.28	YES
CcC	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	B	NO	NO	0.28	YES
SfD	SASSAFRAS AND CROOK, 10 TO 15 PERCENT SLOPES	B	NO	NO	0.37	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
K-FACTOR = Kw @ 0-4" DEPTH  
NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 3/2/13  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 3/2/13  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

PERMIT INFORMATION CHART					
SUBDIVISION NAME		SECTION/ AREA			
GROVEMONT OVERLOOK II - LOTS 4-6		N/A			
LOT / PARCELS	BLOCK NO	ZONE	TAX MAP	ELECT DIST	CENSUS TR
F-13-054 GEELHAAR PROPERTY - LOT 3 AND NON BULD. BULK PARCEL "A" F-13-055 GROVEMONT OVERLOOK PHASE 2 LOTS 37-42, OPEN SPACE LOTS 43-44	24	R-ED	31	1	6011.01
PLAT REF #	WATER / SEWER # 14-4412-D.				
2224B					

NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN**  
**COVER SHEET**  
**GROVEMONT OVERLOOK - II**  
(SFD RESIDENTIAL)

A RESUBDIVISION OF "GEELHAAR PROPERTY", LOT 3 AND "GROVEMONT OVERLOOK", PHASE 2, NON BUILDABLE BULK PARCEL "A"

1ST ELECTION DISTRICT  
TAX MAP: 31 GRID: 24  
DPZ REF'S: PLAT 5947, F-13-054

ZONED: R-ED  
PARCEL: 819 & 749  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS

8407 MAIN STREET  
ELICOTT CITY, MD 21043  
TEL: 410.461.7666  
FAX: 410.461.8961

**OWNER**  
ROBERT T. GEELHAAR  
AND TERRI M. GEELHAAR  
5295 LANDING ROAD  
ELK RIDGE, MD 21075-5715  
PHONE: (410) 367-0422

**DEVELOPER**  
ELICOTT CITY LAND HOLDING INC.  
5300 DORSEY HALL DRIVE, SUITE 102  
ELICOTT CITY, MD 21042-7819  
PHONE: (410) 367-0422

**DESIGN BY:** EDS.  
**DRAWN BY:** EDS.  
**CHECKED BY:** R.H.V.  
**DATE:** FEBRUARY 2013.  
**SCALE:** AS SHOWN  
**W.O. NO.:** 04-57

**PROFESSIONAL CERTIFICATE**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE 09-27-2014

1 SHEET OF 3

**LEGEND:**

- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- DIRECTION OF FLOW
- EXISTING TREELINE
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EXISTING SIDEWALK
- EXISTING STREET TREE
- EXISTING SEWER CONNECTION
- EXISTING WATER CONNECTION
- EX. PUBLIC FOREST CONSERVATION EASEMENT (AFFORESTATION) (F-13-055)
- EX. 10' PUBLIC TREE MAINTENANCE EASEMENT (F-09-122)
- EX. PRIVATE DRAINAGE AND UTILITY EASEMENT (F-09-122)
- EX. PUBLIC 4' SIDEWALK AND UTILITY EASEMENT (F-09-122)
- EX. 24' PRIVATE ACCESS EASEMENT (F-09-122)
- EX. 30' PUBLIC SEWER, WATER, AND UTILITY EASEMENT (F-09-122)
- EX. 3' PUBLIC WATER AND UTILITY EASEMENT (F-09-122)
- EXISTING WETLAND
- EXISTING WETLANDS BUFFER
- SUPER SALT FENCE
- LIMITS OF DISTURBANCE
- PERMEABLE SURFACE
- PROPOSED 10FT CONTOUR
- PROPOSED 2FT CONTOUR
- SPOT ELEVATION
- PROPOSED DRYWELL
- PROPOSED MICRO-BIORETENTION
- ROOFTOP DISCONNECTION FLOWPATH
- DIVERSION FENCE
- SILT FENCE
- EX 15% OR GREATER SLOPES



**LAYOUT PLAN**  
SCALE: 1"=30'

**NOTE:**  
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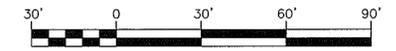
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 3/21/13  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 3/21/13  
 CHIEF, DIVISION OF LAND DEVELOPMENT

MAPPED SOILS TYPES						
SYMBOL	NAME / DESCRIPTION	GROUP	HYDRO	PERCENT HUMUS	K-FACTOR	OTHER NOTES
CeB	CHILLUM LOAM, 2 TO 5 PERCENT SLOPES	B	NO	NO	0.28	YES NO
CcC	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	B	NO	NO	0.28	YES NO
SdC	SASSAFRAS AND CROOM, 10 TO 15 PERCENT SLOPES	B	NO	NO	0.37	YES NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
 K-FACTOR =  $K_w \times 0.4 \text{---} 4 \text{ DEPTH}$   
 NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

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 443-367-0422  
 ELLICOTT CITY LAND HOLDING, INC.  
 5300 DORSEY HALL DRIVE, SUITE 102  
 ELLICOTT CITY, MD 21042-7819  
 443-367-0422

**DEVELOPER**  
 LAND DESIGN & DEVELOPMENT, INC.  
 5300 DORSEY HALL DRIVE  
 SUITE 102  
 ELLICOTT CITY, MD 21042  
 (443) 367-0422



NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN**  
 LAYOUT AND GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN

**GROVEMONT OVERLOOK - II**  
 (SFD RESIDENTIAL)  
 LOTS 4-6  
 A RESUBDIVISION OF "GEEHHAAR PROPERTY" LOT 3 AND "GROVEMONT OVERLOOK", PHASE 2, NON-BUILDABLE BULK PARCEL H

1ST ELECTION DISTRICT  
 TAX MAP: 31 GRID 24  
 DPZ REF: PLAT 5947, F-13-054

ZONED: R-ED  
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 EXPIRATION DATE: 09-27-2014

DESIGN BY: EDS  
 DRAWN BY: EDS  
 CHECKED BY: RHV  
 DATE: FEBRUARY 2013  
 SCALE: AS SHOWN  
 W.O. NO.: 04-52

2 SHEET OF 3

**B.4.B SPECIFICATIONS FOR PERMEABLE PAVEMENTS & REINFORCED TURF**

THESE SPECIFICATIONS INCLUDE INFORMATION ON ACCEPTABLE MATERIALS FOR TYPICAL APPLICATIONS AND ARE NOT EXCLUSIVE OR LIMITING. THE DESIGNER IS RESPONSIBLE FOR DEVELOPING SPECIFICATIONS FOR INDIVIDUAL PROJECTS AND SPECIFIC CONDITIONS.

**1. PERVIOUS CONCRETE SPECIFICATIONS**

DESIGN THICKNESS - PERVIOUS CONCRETE APPLICATIONS SHALL BE DESIGNED SO THAT THE THICKNESS OF THE CONCRETE SLAB SHALL SUPPORT THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED. APPLICATIONS MAY BE DESIGNED USING EITHER STANDARD PAVEMENT PROCEDURES (E.G., AASHTO, ACI 325.9R, ACI 330R) OR USING STRUCTURAL VALUES DERIVED FROM FLEXIBLE PAVEMENT DESIGN PROCEDURES.

MIX & INSTALLATION - TRADITIONAL PORTLAND CEMENTS (ASTM C 150, C 1157) MAY BE USED IN PERVIOUS CONCRETE APPLICATIONS. PHOSPHORUS ADMIXTURES MAY ALSO BE USED. MATERIALS SHOULD BE TESTED (E.G., TRIAL BATCHING) PRIOR TO CONSTRUCTION SO THAT CRITICAL PROPERTIES (E.G., SETTLING TIME, RATE OF STRENGTH DEVELOPMENT, POROSITY, PERMEABILITY) CAN BE DETERMINED.

AGGREGATE - PERVIOUS CONCRETE CONTAINS A LIMITED FINE AGGREGATE CONTENT. COMMONLY USED GRADATIONS INCLUDE ASTM C 33 NO. 67 (3/4 IN. TO NO. 4), NO. 8 (3/8 IN. TO NO.16) AND NO. 89 (3/8 IN. TO NO.50) SIEVES. SINGLE-SIZED AGGREGATE (UP TO 1 INCH) MAY ALSO BE USED.

WATER CONTENT - WATER-TO-CEMENT RATIOS BETWEEN 0.27 AND 0.30 ARE USED ROUTINELY WITH PROPER INCLUSION OF CHEMICAL ADMIXTURES. SHOULD MEET ACI 308 AS A GENERAL RULE. POTABLE WATER SHOULD BE USED ALTHOUGH RECYCLED CONCRETE PRODUCTION WATER MEETING ASTM C 94 OR AASHTO M 157 MAY ALSO BE USED.

ADMIXTURES - CHEMICAL ADMIXTURES (E.G., RETARDERS OR HYDRATION-STABILIZERS) ARE USED TO OBTAIN SPECIAL PROPERTIES IN PERVIOUS CONCRETE. USE OF ADMIXTURES SHOULD MEET ASTM C 494 (CHEMICAL ADMIXTURES) AND ASTM C 260 (AIR ENTRAINING ADMIXTURES) AND CLOSELY FOLLOW MANUFACTURER'S RECOMMENDATIONS.

BASE COURSE - THE BASE COURSE SHALL BE AASHTO NO. 3 OR 4 COURSE AGGREGATE WITH AN ASSUMED OPEN PORE SPACE OF 30% (n=0.30).

**2. PERMEABLE INTERLOCKING CONCRETE PAVEMENTS (PICP)**

PAVER BLOCKS - BLOCKS SHOULD BE EITHER 3" IN. OR 4 IN. THICK, AND MEET ASTM C 936 OR CSA A231.2 REQUIREMENTS. APPLICATIONS SHOULD HAVE 20% OR MORE (40% PREFERRED) OF THE SURFACE AREA OPEN. INSTALLATION SHOULD FOLLOW MANUFACTURER'S INSTRUCTIONS, EXCEPT THAT INFILL AND BASE COURSE MATERIALS AND DIMENSIONS SPECIFIED IN THIS APPENDIX SHALL BE FOLLOWED.

INFILL MATERIALS AND LEVELING COURSE - OPENINGS SHALL BE FILLED WITH ASTM C-33 GRADED SAND OR SANDY LOAM. PICP BLOCKS SHALL BE PLACED ON A ONE-INCH THICK LEVELING COURSE OF ASTM C-33 SAND. BASE COURSE - THE BASE COURSE SHALL BE AASHTO NO. 3 OR 4 COURSE AGGREGATE WITH AN ASSUMED OPEN PORE SPACE OF 30% (n=0.30).

**3. REINFORCED TURF**

REINFORCED GRASS PAVEMENT (RGP) - WHETHER USED WITH GRASS OR GRAVEL, THE RGP THICKNESS SHALL BE AT LEAST 1-3/4" THICK WITH A LOAD CAPACITY CAPABLE OF SUPPORTING THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED.

**A-2. PERMEABLE PAVEMENTS**

**CONSTRUCTION CRITERIA:**

THE FOLLOWING ITEMS SHOULD BE ADDRESSED DURING CONSTRUCTION OF PROJECTS WITH PERMEABLE PAVEMENT:

- EROSION AND SEDIMENT CONTROL: FINAL GRADING FOR INSTALLATION SHOULD NOT TAKE PLACE UNTIL THE SURROUNDING SITE IS STABILIZED. IF THIS CANNOT BE ACCOMPLISHED, RUNOFF FROM DISTURBED AREAS SHALL BE DIVERTED AROUND PROPOSED PAVEMENT LOCATIONS.
- SOIL COMPACTION: SUB SOILS SHALL NOT BE COMPACTED. CONSTRUCTION SHOULD BE PERFORMED WITH LIGHTWEIGHT, WIDE TRACKED EQUIPMENT TO MINIMIZE COMPACTION. EXCAVATED MATERIALS SHOULD BE PLACED IN A CONTAINED AREA.
- DISTRIBUTION SYSTEMS: OVERDRAIN, UNDERDRAIN, AND DISTRIBUTION PIPES SHALL BE CHECKED TO ENSURE THAT BOTH THE MATERIAL AND PERFORATIONS MEET SPECIFICATIONS (SEE APPENDIX B. 4). THE UPSTREAM ENDS OF PIPES SHOULD BE CAPPED PRIOR TO INSTALLATION. ALL UNDERDRAIN OR DISTRIBUTION PIPES USED SHOULD BE INSTALLED FLAT ALONG THE BED BOTTOM.
- SUBBASE INSTALLATION: SUBBASE AGGREGATE SHALL BE CLEAN AND FREE OF FINES. THE SUBBASE SHALL BE PLACED IN LIFTS AND LIGHTLY ROLLED ACCORDING TO THE SPECIFICATIONS (SEE APPENDIX B.4).

**INSPECTION:**

- REGULAR INSPECTIONS SHALL BE MADE DURING THE FOLLOWING STAGES OF CONSTRUCTION:
- DURING EXCAVATION TO SUB GRADE.
  - DURING PLACEMENT AND BACKFILL OF ANY DRAINAGE OR DISTRIBUTION SYSTEM(S).
  - DURING PLACEMENT OF THE CRUSHED STONE SUBBASE MATERIAL.
  - DURING PLACEMENT OF THE SURFACE MATERIAL.
  - UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION.

**MAINTENANCE CRITERIA:**

THE FOLLOWING PROCEDURES SHOULD BE CONSIDERED ESSENTIAL FOR MAINTAINING PERMEABLE PAVEMENT SYSTEMS:

- PAVEMENTS SHOULD BE USED ONLY WHERE REGULAR MAINTENANCE CAN BE PERFORMED. MAINTENANCE AGREEMENTS SHOULD CLEARLY SPECIFY HOW TO CONDUCT ROUTINE TASKS TO ENSURE LONG-TERM PERFORMANCE.
- PAVEMENT SURFACES SHOULD BE SWEEPED AND VACUUMED TO REDUCE SEDIMENT ACCUMULATION AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING SYSTEMS AND COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.
- DRAINAGE PIPES, INLETS, STONE EDGE DRAINS, AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SUBBASE SHOULD BE CLEANED OUT AT REGULAR INTERVALS.
- TRUCKS AND OTHER HEAVY VEHICLES CAN GRIND DIRT AND GRIT INTO THE POROUS SURFACES, LEADING TO CLOGGING AND PREMATURE FAILURE. THESE VEHICLES SHOULD BE PREVENTED FROM TRACKING AND SPILLING MATERIAL ONTO THE PAVEMENT.
- DECIDERS SHOULD BE USED IN MODERATION. WHEN USED, DECIDERS SHOULD BE NON-TOXIC AND ORGANIC AND CAN BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PRETREATED SALT. SNOW PLOWING SHOULD BE DONE CAREFULLY WITH BLADES SET ONE-INCH HIGHER THAN NORMAL. PLOWED SNOW PILES AND SNOW MELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

**HOWARD COUNTY - OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED PERMEABLE PAVEMENT (A-2)**

- THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM POROUS CONCRETE PAVEMENT) THE PAVEMENT SURFACES TO REDUCE SEDIMENT ACCUMULATION AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING OR COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.
- THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SUBBASE.
- THE OWNER SHALL USE DECIDERS IN MODERATION. DECIDERS SHOULD BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PRETREATED SALT.
- THE OWNER SHALL ENSURE SNOW PLOWING IS PERFORMED CAREFULLY WITH BLADES SET ONE-INCH ABOVE THE SURFACE. PLOWED SNOW PILES AND SNOW MELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

**N-1. DISCONNECTION OF ROOFTOP RUNOFF**

**CONSTRUCTION CRITERIA:**

THE FOLLOWING ITEMS SHOULD BE ADDRESSED DURING THE CONSTRUCTION OF PROJECTS WITH PLANNED ROOFTOP DISCONNECTIONS:

- EROSION AND SEDIMENT CONTROL: EROSION AND SEDIMENT CONTROL PRACTICES (E.G., SEDIMENT TRAPS) SHALL NOT BE LOCATED IN VEGETATED AREAS RECEIVING DISCONNECTED RUNOFF
- SITE DISTURBANCE: CONSTRUCTION VEHICLES AND EQUIPMENT SHOULD AVOID AREAS RECEIVING DISCONNECTED RUNOFF TO MINIMIZE DISTURBANCE AND COMPACTION. SHOULD AREAS RECEIVING DISCONNECTED RUNOFF BECOME COMPACTED, SCARPING THE SURFACE OR ROTOTILLING THE SOIL TO A DEPTH OF FOUR TO SIX INCHES SHALL BE PERFORMED TO ENSURE PERMEABILITY. ADDITIONALLY, AMENDMENTS MAY BE NEEDED FOR TIGHT, CLAYEY SOILS.

**INSPECTION:**

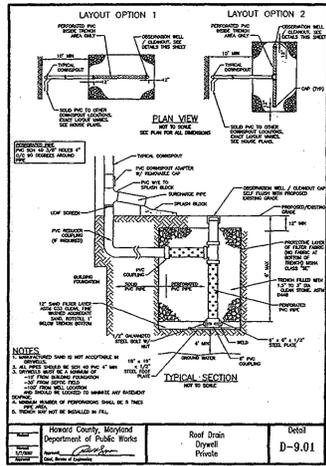
A FINAL INSPECTION SHALL BE CONDUCTED BEFORE USE AND OCCUPANCY APPROVAL TO ENSURE THAT SIZING FOR TREATMENT AREAS HAVE BEEN MET AND PERMANENT STABILIZATION HAS BEEN ESTABLISHED.

**MAINTENANCE CRITERIA:**

MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE AREAS RECEIVING RUNOFF SHOULD BE PROTECTED FROM FUTURE COMPACTION (E.G., BY PLANTING TREES OR SHRUBS ALONG THE PERIMETER). IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.

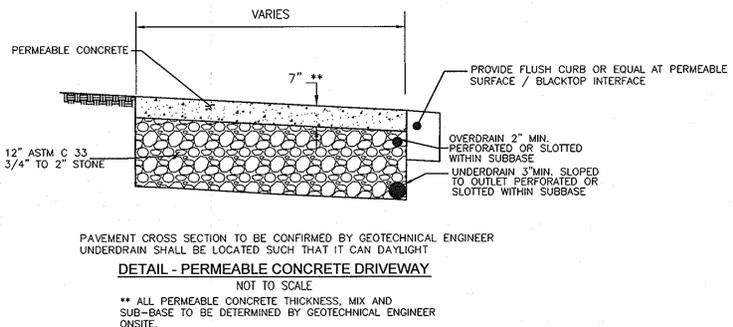
**HOWARD COUNTY - OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DISCONNECTION OF ROOFTOP RUNOFF (N-1), DISCONNECTION OF NON-ROOFTOP RUNOFF (N-2)**

- MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE OWNER SHALL ENSURE THE AREAS RECEIVING RUNOFF ARE PROTECTED FROM FUTURE COMPACTION OR DEVELOPMENT OF IMPERVIOUS AREA. IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.



**HOWARD COUNTY - OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DRYWELL (M-5)**

- THE OWNER SHALL INSPECT & CLEAN ANNUALLY, INCLUDING PIPES, GUTTERS, DOWNSPOUTS AND FILTERS.
- PONDING STANDING WATER OR ALGAL GROWTH ON THE TOP OF A DRYWELL MAY INDICATE FAILURE DUE TO SEDIMENTATION IN THE GRAVEL MEDIA. IF WATER PONDS FOR MORE THAN 48 HOURS AFTER A MAJOR STORM OR MORE THAN SIX INCHES OF SEDIMENT HAS ACCUMULATED, THE GRAVEL MEDIA SHOULD BE EXCAVATED AND REPLACED.



PAVEMENT CROSS SECTION TO BE CONFIRMED BY GEOTECHNICAL ENGINEER UNDERDRAIN SHALL BE LOCATED SUCH THAT IT CAN DRAILIGHT

**DETAIL - PERMEABLE CONCRETE DRIVEWAY**

NOT TO SCALE  
\*\* ALL PERMEABLE CONCRETE THICKNESS, MIX AND SUB-BASE TO BE DETERMINED BY GEOTECHNICAL ENGINEER ON-SITE.

**APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENION, RAIN GARDEN, LANDSCAPE INFILTRATION & INFILTRATION BERMS**

**1. MATERIAL SPECIFICATIONS**

THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

**2. FILTERING MEDIA OR PLANTING SOIL**  
THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR BLENDED WITHIN THE MICRO-BIORETENION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERBERIS GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.02.  
THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:  
\* SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION).  
\* ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (LOSS), COMPOST SAND (20%), AND COMPOST (40%).  
\* CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.  
\* PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED IN TO THE SOIL TO INCREASE OR DECREASE PH.

THIS SHALL BE AT LEAST ONE SOIL TEST PER PROJECT. EACH TEST SHALL CONSIST OF THE STANDARD SOIL TEST FOR PH, AND ADDITIONAL TESTS OF ORGANIC MATTER, AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURAL ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

**3. COMPACTION**

IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE EXCAVATED USING LOADERS, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LOGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

ROTTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDING WATER BEFORE PREPARING (ROTTILLING) BASE.

WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.

WHEN BACKFILLING THE BIORETENION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

**4. PLANT MATERIAL**

RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

**5. PLANT INSTALLATION**  
COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.  
ROOTSOIL OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/3RD OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRONG DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. IRRIGATION SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.

GRASSES AND LEGUME SEED SHOULD BE TILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE HIGH-GRASS GROUND COVER PLANTING SPECIFICATIONS.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS, DEFOLIANTS, OR AT A MINIMUM, IMPROVES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

**6. UNDERDRAINS**

UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:  
\* PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM F758, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED 4" RIGID PIPE (E.G., PVC OF HDPE).  
\* PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH 1/4" GALVANIZED HARDWARE CLOTH.  
\* GRAVEL - THE GRAVEL LAYER (NO. 57 STONE PREFERRED) SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.  
\* THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.  
\* A 6" NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.  
\* A 4" LAYER OF FEA GRAVEL (1/2" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES INTO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".

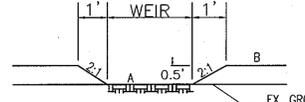
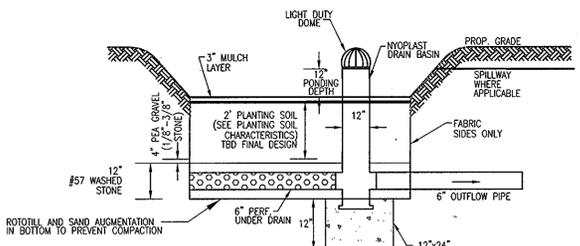
THIS MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5% OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

**7. MISCELLANEOUS**

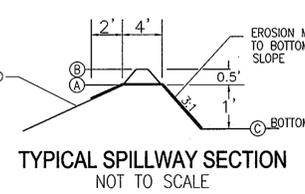
THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

**OPERATION AND MAINTENANCE SCHEDULE FOR MICROBIORETENION AREAS**

- THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II, TABLE A.4-1 AND 2.
- THE OWNER SHALL PERFORM A PLANT INSPECTION IN THE SPRING AND IN THE FALL OF EACH YEAR. DURING THE INSPECTION THE OWNER SHALL REMOVE DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT PLANT MATERIAL, TREAT DISEASED TREES AND SHRUBS AND REPLACE OF ALL DEFICIENT STAKES AND WIRES.
- THE OWNER SHALL INSPECT THE MULCH EACH SPRING. THE MULCH SHALL BE REPLACED EVERY TWO TO THREE YEARS. THE PREVIOUS MULCH LAYER SHALL BE REMOVED BEFORE THE NEW LAYER IS APPLIED.
- THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.



**TYPICAL SPILLWAY PROFILE**  
NOT TO SCALE



**TYPICAL SPILLWAY SECTION**  
NOT TO SCALE

**ENVIRONMENTAL CONCEPT PLAN - SWM CONCEPT PER LOT**

ON LOT PRACTICES ARE SUBJECT TO CHANGE DURING FINAL DESIGN

PROJECT:		GELHAAR PROPERTY - SITE DATA	
TOTAL AREA (LOD):	0.92	AC NEW DEVELOPMENT	
TARGET Pe:	1.60	IN	
IMPERVIOUS:	28.76	PERCENT	
SITE Rv:	0.31		
SITE ESDv:	1650	CF	

LOT AREA	IMPERVIOUS AREA*	GRASS AREA	TOTAL AREA	PERCENT IMPERVIOUS	Rv	ESDv MIN	ESDv MAX	ESDv 1.60	PERCENT OF SITE	ESDv	CF REQ
4	3740	16271	20011	0.19	0.22	N/A	N/A	N/A	N/A	N/A	CF REQ

NOTE:  
1. Lot 4 contains an existing home and driveway to remain. Stormwater management for this lot is not required.

5	4100	15905	20005	0.20	0.23	391	1016	547	0.50		
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PERMEABLE SURFACE DRIVEWAY		590 SF	0.196	116	CF
MICRO BIORETENION	1' POND	290 SF		290	CF
MICRO BIORETENION	1' POND	250 SF		250	CF
				656	CF PROV.

6	4805	15198	20003	0.24	0.27	444	1154	621	0.50		
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PERMEABLE SURFACE DRIVEWAY		1050 SF	0.196	206	CF	
DRYWELL	10	10	4	0.3	120	CF
MICRO BIORETENION	1' POND	380 SF		380	CF	
				706	CF PROV.	

UIC DRIVE	2600	0	2600	1.00	0.95	206	535	288	0.06		
										290	CF
										290	CF PROV.

11505	TOTAL AREA	40008 SF								1651	CF PROV.
											0.92 AC

**APPENDIX B.4 - CONSTRUCTION SPECIFICATIONS**

Appendix B.4. Construction Specifications for Environmental Site Design Practices

**Table B.4.1 Materials Specifications for Micro-Bioretenion, Rain Gardens & Landscape Infiltration-**

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil (2' to 4' deep)	loamy sand (60-65%) & compost (35-40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel/diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile			FE Type I nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe, 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with 1/4-inch galvanized hardware cloth
Poured in place concrete (if required)	MISHA Mix No. 3; Fc = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.8R/9; vertical loading (H-10 or H-20); allowable horizontal loading (based on soil pressure); and analysis of potential cracking. Sand substitutions such as Diabase and Gneissstone (AASHTO) #10 are not acceptable. No calcium carbide or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	

NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN STORMWATER MANAGEMENT NOTES AND DETAILS**

**GROVEMONT OVERLOOK - II**  
(SFD RESIDENTIAL)  
LOTS 4 - 6  
A SUBDIVISION OF "GELHAAR PROPERTY", LOT 3 AND "GROVEMONT OVERLOOK", PHASE 2, NON BULKHEAD BULK PARCEL H

1ST ELECTION DISTRICT TAX MAP: 31 GRID: 24 DPZ REF'S: PLAT 5947, F-13-054

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
8407 MAIN STREET ELLICOTT CITY, MD 21043 TEL: 410.461.7666 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE: 08-27-2014

DESIGN BY: EDS  
DRAWN BY: EDS  
CHECKED BY: RHY  
DATE: FEBRUARY 2013  
SCALE: AS SHOWN  
W.O. NO.: 04-57

3 SHEET OF 3

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION  
CHIEF, DIVISION OF LAND DEVELOPMENT

**NOTE:**